**Scenario:**

Your friends come to you to ask you to create a tournament tracker. They are always playing games and want to determine who is the best. The idea is that you create a bracket tournament system where the computer will tell who to play in a single-elimination style bracket. At the end, the winner should be identified. Their model is the NCAA Basketball tournament bracket for March Madness.

**Planning step 1 (requirements + questions) + Planning step 2 (answers + big picture design):**

* **Requirements:**

1. Tracks games played and their outcome (who won)
2. Multiple competitors play in the tournament
3. Creates a tournament plan (who plays in what order)
4. Schedules games
5. A single eliminates a player from tournament
6. The last player standing is the winner

* **Ask for mor requirements: Questions:**

1. How many players will the tournament handle? Is it variable?

The application should be able to handle a variable number of players in a tournament.

1. If a tournament has less than the full complement of players, how do we handle it?

A tournament with less than the perfect number (a multiple of 2, so 4, 8, 16, 32, etc.) should add in “byes”. Basically, certain people selected at random get to skip the first

Round and act as if they won.

1. Should the ordering of who plays each other be random or ordered by input order

The ordering of the tournament should be random.

1. Should we schedule the game or are they just played whenever?

The games should be played in whatever order and whenever the players want to play them.

1. If the games are scheduled, how does the system know when to schedule games for?

They are not scheduled so we do not care

1. If the games are played whenever, can a game from the second round be played before the first round is complete?

No. each round should be fully completed before the next round is displayed

1. Does the system need to store a score of some kind or just who won?

Storing a simple score would be nice. Just a number for each player. That way, the tracker can be flexible enough to handle a checkers tournament (the winner would have a 1 and the loser a 0) or a basketball tournament.

1. What type of front-end should this system have (form, webpage, app, etc.)?

The system should be a desktop system for now, but down the road we might want to turn it into an app or a website

1. Where will the data be stored?

Ideally, the data should be stored in a Microsoft SQL database but please put in an option to store to a text file instead.

1. Will the system handle entry fees, prizes, or other payouts?

Yes. The tournament should have the option of charging an entry fee. Prizes should also be an option, where the tournament administrator chooses how much money to award a variable number of places. The total cash amount should not exceed the income from the tournament. A percentage-based system would also be nice to specify.

1. What type of reporting is needed?

A simple report specifying the outcome of the games per round as well as a report that specifies who won and how much they won. These can be just displayed on a form or they can be emailed to tournament competitors and the administrator.

1. Who can fill in the results of a game?

Anyone using the application should be able to fill in the game scores.

1. Are there varying levels of access?

No. The only method of varied access is if the competitors are not allowed into the application and instead, they so everything via email.

1. Should the system contact users about upcoming games?

Yes, the system should email users that are due to play in a round as well as who they are scheduled to play.

1. Is each player on their own or can teams use this tournament tracker?

The tournament tracker should be able to handle the addition of other members. All members should be treated as equals in that they all get tournament emails. Teams should also be able to name their team.

* **Big Picture Design:**

Structure: Windows Forms application and Class Library

Data: SQL and/or Text File

Users: One at a time on one application

Key Concepts:

* + Email
  + SQL
  + Custom Events
  + Error Handling
  + Interfaces
  + Random Ordering
  + Texting

**Planning step 3:**

* **Mapping the data:**

Team:

* + TeamMembers (List<Person>)
  + TeamName(string)

Person:

* + FirstName(string)
  + LastName(string)
  + EmailAddress(string)
  + CellphoneNumber (string)

Tournament:

* + TournamentName (string) // ping pong tournament, or basketball tournament …
  + EntryFee (decimal) // each team must pay a fee // decimal is very precise but it takes more memory. Use it for money
  + EnteredTeams (List<Team>)
  + Prizes (List<Prize>) //zero or more list
  + Rounds (List<<List<Matchup>>) //matchups per round. One list represents one round

Note: For SQL tables (team, person, tournament) we will need a unique fields (Id’s)

Prize:

* + PlaceNumber (int) // the player place (1st, 2nd ….)
  + PlaceName (string) // Champion, first runner-up, etc. (Tim won the championship and got $50, Tim was the first runner-up and earn $25, etc.)
  + PrizeAmount (decimal) //is either a flat (fixed) amount or a percentage
  + PrizePercentage (double) //for example 0.5 is 50%

//if PrizeAmount = 0 and PrizePercentage = 0.5, we use percentage amount and vice versa.

Matchup:

* + Entries (List<MatchupEntry>) // at least two persons
  + Winner (Team)
  + MatchupRound (int) //Is this for matchup 1 or 2 or 18, etc.

MatchupEntry:

* + TeamCompeting (Team)
  + Score (double) //start at 0
  + ParentMatchup (Matchup) //to have multiple data points about that entry in one object

In this way we can order the list based on the score for example. For example

“give me the top one match up entry order by score”, but if the score goes on the opposite direction like golf, we can say take the entries list and order it descending by score. Also you can know the team where is come from “this team came from this matchup in round one, so round one played and team 1 played team 2 and team one lost and team 2 goes on to round 2, etc.”

**Planning step 4:**

* **User Interface Design (initial design):**
* Tournament Viewer/Form:
  + A form that display all the information about the tournament
  + Label 🡪 display the tournament name
  + Label (Round) – beside it a drop box menu and a Listbox (matchupsListBox) to show all the matchups play in a single round. Check box (Unplayed Only) to display just the un-played games only
  + Label (first team name) and TextFeild (first team score).
  + Label (VS)
  + Label (second team name) and TextFeild (second team score).
  + Button (score) to calculate the score and complete the matchup
* Create Tournament Form:
  + Label (Create Tournament)
  + Label (Tournament Name) and TextFeild
  + Label (Entry Fee) and TextFeild
  + Label (Select Team) and DropBox menu to choose a team
  + ButtonLink (Create new team)
  + Button (Add Team)
  + Label (Teams/Players) and a ListBox (tournamentListBox) to display the teams have been chosen
  + Button (Delete selected team) if you want to remove a team from the DropBox
  + Button (Create Prize) to go to Prize form and create a new prize
  + ListBox (prizesListBox) to display the prizes available to the specific tournament + Button (Delete selected prize) to delete a prize from the ListBox
  + Finally, Button (Create Tournament) to take all the information from the form and create the tournament object
  + **Note**: this form doesn’t cover Rounds in any way because rounds are random, and the number of rounds is determined based upon the number of the teams
* Create Team Form:
  + Label (Create Team)
  + Label (Team Name) and TextFeild
  + Label (Select Team Member) and DropBox Menu to select the team members who already exists + Button (Add Member) to add it to the ListBox (tournamentPlayerListBox)
  + Label (Add New Member) above a small form to create a new member:
    - Label (FirstName) + TextFeild
    - Label (LastName) + TextFeild
    - Label (Email) + TextFeild
    - Label (Cellphone) + TextFeild
    - Button (Create Member) to add it to the DropBox Menu
  + Finally, a Button (Create Team) to take the form information
* Create Prize Form:
  + Label (Create Prize)
  + Label (Place Number) + TextFeild //1st, 2nd, etc.
  + Label (Place Name) + TextFeild //Champion, first runner-up, etc.
  + Label (Prize Amount) + TextFeild //$20.00 or prize percentage choose between them at build time (one of them should be zero)
  + Label (Or)
  + Label (Prize Percentage) + TextFeild //0.15 or prize amount choose between them at build time (one of them should be zero)
  + Finally, a Button (Create Prize) to take the form information
* Tournament Dashboard Form:
  + Label (Tournament Dashboard)
  + Label (Load Existing Tournament) + DropBox to choose an existing tournament + Button (Load Tournament) and will open the tournament viewer
  + Button (Create Tournament) to create a new tournament for a new tournament and open it in the tournament viewer

**Planning step 5 – Logic Planning:**

* Tournament Viewer/Form:
  + Label (Tournament Name) will updated when loading the form
  + The DrobBox Menu will load the information form the database, but it will calculate (the list of the list matchups/ the whole object rounds) and will figure out how many rounds are in the round object. For example, if the tournament has four rounds, the dropBox has to have round 1, round 2, etc. and has to know the list entry for each round and will change the matchupListBox shows
  + Check Box (Unplayed Only): if its checked then we will filter the records in the matchupListBox, not only which round we’re in but also if a game is played or not.
  + Based on the selected item in the matchupListBox the scores labels and the textfeilds for each team will change (update team names and put the scores in the textfeilds)
  + Button (score) will allow us to change that matchups scores and based on that will finalize and say the matchup is over and display the winner. Note: if is the last unplayed game in the round, the score button should trigger the next round or if it’s the last game in the last round (the championship game) then trigger the end of the tournament information (assign prizes) and email people. The button should have a logic to know if we are in the current round, so it doesn’t missed up the scores.
* Create Tournament Form:
  + ButtonLink (Create new team) to create a new team and add it to the tournamentListBox
  + Button (Add Team) to add the team to the tournamentListBox after choosing in it from the DropBox menu and remove it from DropBox and refresh all
  + Button (Delete selected team) to remove a team from the tournamentListBox and put back in the DropBox Menu
  + Button (Create Prize) to go to Prize form and create a new prize and it to the prizesListBox
  + Button (Delete selected prize) to delete a prize from the prizesListBox
  + Finally, Button (Create Tournament):
    - Validate all the information provided in the form
    - Create the schedule (Rounds property) //how many temas should be in the tournament and how many byes we should have to make up for the missing teams. For example, if the tournament has 10 teams, the tournament should start with 16 teams, so we have to have 6 byes in the first round. Because the tournament should be 4, 8 , 16 or 32 etc. So it can’t be 10
    - Create the tournament object
* Create Team Form:
  + Button (Add Member) to add it to the ListBox (tournamentPlayerListBox) and remove it from the DropBox Menu and refresh both lists
  + Button (Create Member) to add it to the tournamentPlayerListBox and empty the fields
  + Finally, a Button (Create Team) to take the form information and validate them
  + // we need a button to delete a team from tournamentPlayerListBox and put it back in the DropBox Menu
* Create Prize Form:
  + A Button (Create Prize) to take the form information and validate them and send the information back to the calling form and close the current form
* Tournament Dashboard Form:
  + After selecting an existing tournament from the DropBox Menu, the Button (Load Tournament) will load it to the tournament viewer
  + Button (Create Tournament) to create a new tournament and add it to DropBox Menu so you can load that tournament using Load Tournament Button